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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/804,347

03/19/2004

John W. Hoard

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EXAMINER

TRAN, DIEM T

ART UNIT

PAPER NUMBER

3748

MAIL DATE

DELIVERY MODE

10/04/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/804,347

Applicant(s)

HOARD ET AL.

Examiner

Diem Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE filed on 9/14/07.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 5, 6, 10, 14, 15, 17-22 is/are rejected.
- 7) ☒ Claim(s) 2-4, 7-9, 11-13 and 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

This office action is in response to the Request for Continued Examination filed on 9/14/07. In this amendment, claims 1, 10-12, 14, 19, 22 have been amended. Overall, claims 1-22 are pending in this application.

Claim Objections

Claims 11, 12 are objected to because of the following informalities:

-The statuses of claims 11, 12 should be changed to --(currently amended)--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 5, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Hemingway et al. (US Patent Application 2004/0093853) in view of Hoard et al. (US Patent 6,363,714).

Regarding claims 1, 5, 6, Hemingway discloses a method for diagnosing operation of a non-thermal plasma discharge device disposed in the exhaust of an internal combustion engine, comprising:

controlling the power of the plasma based on the concentration of the NO_x in the exhaust gas wherein said engine exhaust has a lean NO_x trap (14) disposed downstream of the non-thermal plasma discharge device (12) and substantially all gases coming to said lean NO_x trap have previously passed through the non-thermal plasma discharge device (12)(see Figure 1, page 3, par. [27, 28, 31]); however, fails to disclose determining said non-thermal plasma discharge device being operating properly when a concentration of NO_x of exhaust gases exiting said lean NO_x trap increases in response to reducing power to the non-thermal plasma discharge device. Hoard teaches that higher energy deposition to the plasma device is commanded under conditions of high NO_x production in the exhaust gas, and lower energy deposition to the plasma device is commanded while under lower NO_x conditions (see col. 5, lines 14-20).

In Hoard, when a NO_x concentration in the exhaust gas is increased, an applied power to the plasma reactor is increased in order to reduce more NO_x in the exhaust gas to maintain the NO_x concentration within a desired range. If the applied power is then reduced, the NO_x concentration would increase above a desired range, therefore, it would have been obvious for one having ordinary skill in the art, to realize that the thermal plasma in the modified Hemingway is determined to work properly when tailpipe NO_x concentration in the exhaust gases increases in response to reducing an applied power to the plasma reactor.

Claims 10, 14, 15, 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakanishi et al. (US Patent 7,043,902) in view of Hoard et al. (US Patent 6,363,714).

Regarding claims 10, 14, 15, 19-22, Nakanishi discloses a method for diagnosing operation of a non-thermal plasma discharge device disposed in the exhaust of an internal combustion engine, comprising:

controlling the power of the plasma based on the concentration of the NO_x in the exhaust gas wherein said engine exhaust has a lean NO_x trap (14) disposed downstream of the non-thermal plasma discharge device (13) and substantially all gases coming to said lean NO_x trap have previously passed through the non-thermal plasma discharge device (13), a fuel injector located upstream of said non-thermal plasma discharge device (see Figure 1, col. 11, lines 45-57, col. 12, lines 6-15, col. 13, lines 3-8); however, fails to disclose determining said non-thermal plasma discharge device being operating properly when a concentration of NO_x of exhaust gases exiting said lean NO_x trap increases in response to reducing power to the non-thermal plasma discharge device. Hoard teaches that higher energy deposition to the plasma device is commanded under conditions of high NO_x production in the exhaust gas, and lower energy deposition to the plasma device is commanded while under lower NO_x conditions (see col. 5, lines 14-20).

In Hoard, when a NO_x concentration in the exhaust gas is increased, an applied power to the plasma reactor is increased in order to reduce more NO_x in the exhaust gas to maintain the NO_x concentration within a desired range. If the applied power is then reduced, the NO_x concentration would increase above a desired range, therefore, it would have been obvious for one having ordinary skill in the art, to realize that the thermal plasma in the modified Nakanishi is determined to work properly when tailpipe NO_x concentration in the exhaust gases increases in response to reducing an applied power to the plasma reactor.

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Regarding claims 17, 18, Nakanishi further discloses that said operating model provides a computation of fuel and electrical energy to supply to the nonthermal plasma discharge device based on exhaust gas temperature (see col. 7, lines 24-28, 43-49, col. 8, lines 63-67, col. 9, lines 1-3).

Allowable Subject Matter

Claims 2-4, 7-9, 11-13, 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication from the examiner should be directed to Examiner Diem Tran whose telephone number is (571) 272-4866. The examiner can normally be reached on Monday -Friday from 8:00 a.m.- 6:00p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion, can be reached on (571) 272-4859. The fax number for this group is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the

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Private PAIR system, contact the Electronic Business Center (EBC) at 800-786-9199 (toll-free).



Diem Tran
Patent Examiner



THOMAS DENION
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700